

Appl. No. 10/726,134
Amdt. dated August 8, 2005
Reply to Office action of April 7, 2005

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended) A ligand detection device ~~for the detection of ligands~~ comprising:
at least one substrate;

at least one receptor attached to said substrate, wherein said at least one receptor is capable of binding [to a] at least one ligand to form a receptor-ligand complex; wherein the at least one substrate is positioned and moveable within an amount of a liquid crystalline material having the at least one ligand therein, wherein upon formation of said receptor-ligand complex, optical characteristics of said liquid crystalline material are altered to allow detection of said ligands at least one ligand.

Claim 2 (original) The device of claim 1, wherein said at least one receptor is attached to the surface of said substrate.

Claim 3 (previously presented) The device of claim 1, wherein the substrate is a porous substrate and said at least one receptor is attached to at least one pore of a porous substrate.

Claim 4 (previously presented) The device of claim 3, wherein a plurality of receptors are attached to and randomly distributed on the surface and within the pores of said porous substrate.

Claim 5 (original) The device of claim 1, wherein the liquid crystalline material is selected from the group consisting of thermotropic liquid crystalline material and lyotropic liquid crystalline material.

Claim 6 (original) The device of claim 5, wherein the liquid crystalline material is a lyotropic liquid crystalline material.

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Claim 7 (original) The device of claim 6, wherein the lyotropic liquid crystalline material is a lyotropic chromonic liquid crystalline material.

Claim 8 (original) The device of claim 5, wherein the liquid crystalline material is a thermotropic liquid crystalline material.

Claim 9 (original) The device of claim 1, wherein the substrate is made from a material selected from the group consisting of polymeric and inorganic materials.

Claim 10 (original) The device of claim 9, wherein the polymeric materials are selected from the group consisting of polyions, polyalkenes, polyacrylates, polymethacrylates, polyvinyls, polystyrenes, polycarbonates, polyesters, polyurethanes, polyamides, polyimides, polysulfones, polysiloxanes, polysilanes, polyethers, and polycarboxylates.

Claim 11 (previously presented) The device of claim 9, wherein the polymeric material is a polystyrene.

Claim 12 (previously presented) The device of claim 1, wherein the substrate is a substantially spherical substrate.

Claim 13 (previously presented) The device of claim 9, where the substrate is made from an inorganic material selected from the group consisting of glass, silicon, and colloidal gold.

Claim 14 (original) The device of claim 13, wherein the inorganic material is glass.

Claim 15 (original) The device of claim 1, wherein said at least one receptor is attached to said substrate by at least one means selected from the group consisting of (i) chemical attachment and (ii) physical attachment.

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Claim 16 (original) The device of claim 15, wherein said chemical attachment is covalent bonding.

Claim 17 (previously presented) The device of claim 15, wherein said physical attachment is selected from the group consisting of: hydrophobic interactions and van der Waals interactions.

Claim 18 (currently amended) A method for detecting ligands comprising:

providing a device for detecting ligands, said device comprising at least one substrate; at least one receptor attached to said substrate, wherein said at least one receptor is capable of binding to a ligand to form a receptor-ligand complex, and wherein said substrate is positioned within a liquid crystalline material;

contacting a sample with the device, the sample including at least one ligand adapted to ~~bind~~ bindable to the receptor to form the receptor-ligand complex, and

detecting the presence of a ligand by means of a change in the optical characteristics of the liquid crystalline material generated by said receptor-ligand complex formation.

Claim 19 (previously presented) A device for the detection of ligands comprising:

at least one substantially spherical substrate;

at least one receptor attached to said substantially spherical substrate, wherein said at least one receptor is capable of binding to a ligand to form a receptor-ligand complex; and

an amplification mechanism comprising a liquid crystalline material, wherein the optical characteristics of the liquid crystalline material vary to detect the presence of said ligands upon receptor-ligand complex formation within the liquid crystalline material.

Claim 20 (currently amended) A device for detection of a ligand comprising:

an amount of liquid crystalline material, the liquid crystalline material having initial optical transmission characteristics[.];

at least one substrate positioned in the amount of liquid crystalline material so as to be moveable therein;

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at least one ligand receptor associated with the at least one substrate, the ligand receptor capable of attaching to a ligand, wherein upon attachment of a ligand to the receptor, the initial optical characteristics of the liquid crystalline material are altered; and

a detector for detecting a change in the initial optical characteristics of the liquid crystalline material to determine the presence of a ligand.

Claim 21 (currently amended) A method for detecting a ligand comprising the steps of:

providing an amount of liquid crystalline material having initial optical characteristics[,];
positioning at least one substrate having at least one ligand receptor associated therewith,
the liquid crystalline material so as to be moveable throughout the liquid crystalline material[,];
and

detecting a change from the initial optical characteristics in the liquid crystalline material
indicating attachment of at least one ligand to the receptor and the presence of the ligand thereby.